

**WORK PLAN/
SAMPLING AND ANALYSIS PLAN**

**PARCEL NOS. 051-99-0014-701 AND 051-99-0003-000
TAYLOR, MICHIGAN 48180**

for

**DOWNRIVER COMMUNITY CONFERENCE
BROWNFIELD CONSORTIUM
15100 NORTHLINE ROAD
SOUTHGATE, MICHIGAN**

**AKT PEERLESS PROJECT NO. 6278F-2-20
SEPTEMBER 24, 2009**

TABLE OF CONTENTS

1.0	<u>INTRODUCTION</u>	1
2.0	<u>PROPERTY LOCATION/DESCRIPTION</u>	1
2.1	<u>CURRENT USE</u>	1
2.2	<u>PREVIOUS ENVIRONMENTAL INVESTIGATIONS</u>	1
3.0	<u>PURPOSE AND SCOPE</u>	2
4.0	<u>SUBSURFACE INVESTIGATION FIELD ACTIVITIES</u>	2
5.0	<u>INVESTIGATIVE PROCEDURES</u>	3
5.1	<u>SOIL SAMPLE COLLETION</u>	3
5.1.1	Soil Boring Location and Depth	3
5.1.2	Sample Collection Methodology	4
5.1.3	Selection of Soil Samples for Analyses	4
5.2	<u>GROUNDWATER SAMPLE COLLECTION</u>	5
5.2.1	Sample Collection Methodology	5
5.2.2	Selection of Groundwater Samples for Analyses	5
5.3	<u>METHANE ASSESSMENT</u>	5
5.4	<u>QA/QC SAMPLE COLLECTION</u>	6
5.5	<u>CHAIN-OF-CUSTODY</u>	6
5.6	<u>DECONTAMINATION PROCEDURES</u>	6
5.6.1	Sample Collection Equipment	6
5.6.2	Disposal of Investigation Derived Materials	7
5.7	<u>PERSONNEL MONITORING</u>	7
6.0	<u>HEALTH AND SAFETY PLAN</u>	7
7.0	<u>SIGNATURE</u>	8

FIGURES

1. Topographic Site Location Map
2. Proposed Sample Location Map

**WORK PLAN/SAMPLING AND ANALYSIS PLAN
FOR
PARCEL NOS. 051-99-0014-701 AND 051-99-0003-000
TAYLOR, MICHIGAN 48180**

1.0 INTRODUCTION

AKT Peerless Environmental & Energy Services (AKT Peerless) has prepared this Work Plan/Sampling and Analysis Plan (Work Plan/SAP) on behalf of the Downriver Community Conference Brownfield Consortium (DCCBC) for assessment using DCCBC's U.S. Environmental Protection Agency (EPA) Brownfield Assessment Hazardous Substance Grant. The purpose of this Work Plan/SAP is to document the (1) data gathering and sampling methodologies, (2) sample frequency, locations, and rationale and (3) procedures and protocol for the proposed subsurface investigation. The subject property was determined to be an eligible property by the EPA on August 7, 2009.

2.0 PROPERTY LOCATION/DESCRIPTION

The subject property is located in the southwest ¼ of Section 19 in Taylor (T.3S./R.10E.), Wayne County, Michigan. The subject property is situated north of Northline Road and east of Inkster Road. It consists of one rectangular parcel and one irregularly-shaped parcel that contain approximately 41.82 acres combined. The City of Taylor is the current owner and manager of the subject property which is currently unoccupied. The subject property's parcel identification numbers are 051-99-0014-701 (Parcel A) and 051-99-0003-000 (Parcel B).

2.1 CURRENT USE

The subject property is not currently used for any significant or obvious purpose. Parcel A of the subject property is zoned TRO for Technology, Research, and Office usage. Parcel B of the subject property is zoned R-1B for a Single Family Residential Dwelling.

2.2 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

2.2.1 AKT Peerless' September 1, 2009 Phase I Environmental Site Assessment

AKT Peerless identified the following recognized environmental conditions (RECs) in connection with the subject property:

- **REC #1:** AKT Peerless observed surface disturbances potentially related to mining and filling activities on Parcel B of the subject property in the 1985 aerial photograph. It is AKT Peerless' opinion that a potential exists for the subject property's soil and/or groundwater to have been adversely affected by the processes that caused the referenced surface disturbances.
- **REC #2:** AKT Peerless observed two soil mounds on the southwestern portion of Parcel A of the subject property. AKT Peerless was unable to determine the origin of these soil mounds. It is AKT Peerless' opinion that a potential exists for the subject property's soil and/or groundwater to have been adversely affected by the presence of these soil mounds.

3.0 PURPOSE AND SCOPE

The purpose of this Work Plan/SAP is to evaluate the recognized environmental conditions identified in AKT Peerless' September 2009 Phase I ESA.

4.0 SUBSURFACE INVESTIGATION FIELD ACTIVITIES

The following field investigative activities will be conducted as part of the subsurface investigation:

- Excavate 10 test pits using a backhoe to explore for the potential presence of fill material. The depth of the test pits will be based on the depth of the fill material or the maximum capability of the backhoe.
- Drill 8 soil borings using a hydraulic probe rig, to a maximum depth of 20 feet below ground surface (bgs). The locations of the borings will be dependent upon results of the test pitting activities.
- Advance two soil borings using a hand auger.
- Collect one soil sample from each boring location.
- Install five temporary monitor wells.
- Collect one groundwater sample from each of the temporary monitoring wells using low-flow sampling techniques.
- Once groundwater samples are collected, convert the five temporary monitor well locations into shallow methane monitoring wells in the fill material.
- Complete a screening for methane within the methane monitoring wells.
- Submit the samples to laboratory for analysis, depending on the area of concern for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), Michigan 10 Metals¹, polychlorinated biphenyls (PCBs), and methane.
- Prepare a Phase II ESA Report.

If field observations indicate the possible presence of contamination (visual/olfactory evidence or significant photoionization detector (PID) responses), soil borings may be drilled deeper than 20 feet bgs to further assess subsurface conditions.

Five temporary monitoring wells (TMWs) will be installed at ten of the soil boring locations to evaluate groundwater conditions. In the event groundwater is not encountered at one or all of these locations, additional soil samples will be collected at a deeper interval and be submitted for laboratory analysis.

Five methane monitoring wells will be installed to evaluate subsurface methane conditions. Well locations will be spatially separated to evaluate the entire property.

The following table provides a summary of the proposed sampling plan.

¹ Michigan 10 Metals include: Arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc.

PROPOSED SAMPLING PLAN

SOIL BORINGS AND SAMPLE COLLECTION				
REC	SOIL BORING		SAMPLES	ANALYSES
1	SB-1 through SB-8, TP-1 through TP-10		8-soil, 5-groundwater,	VOCs, PNAs, Michigan 10 Metals, PCBs. dissolved methane
2	SB-9, SB-10		2-soil	VOCs, PNAs, Michigan 10 Metals, PCBs
QUALITY ASSURANCE/QUALITY CONTROL SAMPLES				
MATRIX	DUPLICAT E	EQUIPMENT BLANK	FIELD BLANK	MS/MSD
Soil	1	1	1	1
Groundwater	1	1	1	1

*Trip and Methanol Blanks will be collect one per cooler.

If groundwater is encountered, TMWs will be installed at SB-2, SB-4, SB-6, SB-7, and SB-8. These locations will provide a broad coverage of the subject property.

5.0 INVESTIGATIVE PROCEDURES

This section presents the procedures and equipment for performing the planned subsurface investigation activities at the subject property. The number of samples associated chemical analyses, sample containers, preservation, and holding time requirements presented are provided in AKT Peerless' Quality Assurance Project Plan (QAPP). Standard forms including soil boring logs, daily field reports, and chains-of-custody are provided in the QAPP.

5.1 SOIL SAMPLE COLLETION

AKT Peerless will retain a drilling contractor to install the soil borings to a maximum depth of twenty (20) feet bgs using a hydraulic push probe, hand auger, or Geoprobe®. Borings will be advanced following American Society for Testing and Materials (ASTM) publication D-6282 *Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations*. When possible, a macro core soil sampler will be used to collect continuous soil samples. If time is limited or subsurface soils restrict the penetration of the macro core sampler, a 2-foot-long discrete sampler will be used in place of the macro sampler. AKT Peerless will screen all soil samples with a PID. See Figure 2 for a site map with the proposed sampling locations.

5.1.1 Soil Boring Location and Depth

The soil boring locations and depths were selected based on the results of AKT Peerless' Phase I ESA and are intended to evaluate the recognized environmental conditions identified in that Phase I ESA. Soil borings will be advanced to a maximum depth of approximately 20 feet bgs. The depth of the soil borings are based on the most likely release point of contamination for each REC. AKT Peerless expects that 20 feet bgs will be a sufficient depth to evaluate the REC. If field observations indicate that contamination may be present at depths greater than 20 feet, then AKT Peerless will drill deeper soil borings. Soil samples from each soil boring will be collected continuously for field screening and visual characterization from each boring location.

5.1.2 Sample Collection Methodology

Soil samples will be obtained in accordance with AKT Peerless SOP-1 (Rev. 1.0), a copy of which is provided in the QAPP.

5.1.3 Selection of Soil Samples for Analyses

Soil samples will be collected to evaluate the recognized environmental conditions identified at the subject property. Based on AKT Peerless' field screening, soil samples will be collected from the most likely point of a contaminant release and/or migration for the identified RECs. Further, soil samples may be collected in areas where AKT Peerless observes visual/olfactory indication of contamination or a significant PID response. Soil samples will not be collected from saturated soil.

In addition to the operating procedures presented in AKT Peerless SOP-1 (Attachment C, QAPP), the following procedures will be followed when collecting soil samples for laboratory analyses:

- Soil sampling locations will be identified in the field and recorded in a logbook.
- Soil samples will be collected continuously.
- Soil samples will be selected for laboratory analyses and placed into laboratory-supplied containers.
- Sample containers will be labeled as described in the QAPP.
- Samples will be maintained at approximately 4 ° C during storage and shipment to the laboratory for analyses.
- Sampling equipment will be decontaminated in accordance with AKT Peerless SOP-4, presented in Attachment C of the QAPP.
- Lithologic characteristics (color, texture, grain size and consistency) of the soil at each soil boring location will be recorded on AKT Peerless Form No. FF-3.
- Soil boring locations will be scaled on a site map.

Soil sampling equipment may include the following:

- Health and safety equipment/health and safety plan (Exhibit 2 of QAPP),
- Geoprobe®,
- Hand Auger,
- Appropriate field forms, including chains-of-custody,
- Sample labels and custody seals,
- Logbooks, marking pens, overnight courier air bills and pouches,
- PID meter,
- Distilled or deionized water,
- Cooler with ice,
- Laboratory grade detergent, stiff brush, bucket, wash tub,
- Sample containers and packaging material,
- Tape measure, and
- Camera and film.

5.2 GROUNDWATER SAMPLE COLLECTION

If encountered, groundwater samples will be collected from five of the ten soil boring locations using temporary monitoring wells. Based on AKT Peerless' experience with other projects in this region of the state, shallow groundwater is expected to be encountered within 20 feet of ground surface. In addition, a clay confining layer (aquitar) is generally encountered in Southeast Michigan within 16-20 feet bgs. This layer commonly prohibits the vertical migration of groundwater contamination into deeper aquifer. Therefore, AKT Peerless only intends to collect shallow groundwater samples. In the event groundwater is not encountered at one or all of these locations, additional soil samples will be collected at a deeper interval (within 20 feet bgs) and be submitted for laboratory analysis. See Figure 2 for a site map with the proposed sampling locations.

5.2.1 Sample Collection Methodology

Groundwater samples will be collected from temporary monitoring wells in accordance with AKT Peerless SOP-2. See the QAPP for a copy of SOP-2.

5.2.2 Selection of Groundwater Samples for Analyses

Groundwater samples will be collected from the upper 2.5 feet of the water table. The following procedures will be followed when collecting groundwater samples for laboratory analyses:

- Groundwater sampling locations will be identified in the field and recorded in a logbook.
- Dedicated/disposable sample tubing will be used to collect each groundwater sample to limit the potential for cross-contamination.
- Groundwater samples collected for laboratory analyses will be placed into the appropriate sample containers.
- Sample containers will be labeled as described in the QAPP.
- Samples will be maintained at approximately 4 ° C during storage and shipment to the laboratory for analyses.
- Groundwater sampling locations will be scaled on a site map.

Groundwater sampling equipment will include the following:

- Health and safety equipment/health and safety plan (Exhibit 2 of the QAPP),
- Peristaltic pump and disposable tubing,
- Conductivity, pH, and temperature meter(s),
- Tedlar Bags
- Appropriate field forms, including chains-of-custody,
- Sample labels and custody seals,
- Logbooks, marking pens, overnight courier air bills and pouches,
- Distilled or deionized water,
- Cooler with ice, and
- Sample containers and packaging material.

5.3 METHANE ASSESSMENT

AKT Peerless will retain a drilling subcontractor to advance up to ten borings across the subject property where historic waste disposal activities have occurred. Five of the ten soil borings will be converted to a monitoring well to evaluate the potential for methane gas. Well locations will be spatially separated to evaluate the entire property. Soil borings will be advanced with a drill rig using a hydraulic push probe or Geoprobe®. See Figure 2 for a Proposed Sample Location Map.

AKT Peerless proposes to obtain initial methane readings from each of the methane monitoring wells. Methane gas readings will be obtained using a portable gas meter (PGM), such as a GEM 500 or GEM 2000. Barometric pressure will also be recorded during each day of which sampling is conducted to identify that the most accurate readings are recorded for each methane gas monitoring event. The PGM will be calibrated to methane before each sampling event.

After the PGM is connected to the dedicated tubing the valve is then opened, the peak reading will be recorded and the gas will be screened continuously until stable. The gas readings will be considered stable when a consistent percentage has been recorded for 45 seconds. The initial, peak and stable readings will be recorded in the field logbook.

Following the above sampling method, a Tedlar Bag will be connected to the sample port of the PGM, with dedicated tubing after the gas readings are stable, allowing the gases to fill the bag. When collecting water samples, a Tedlar Bag is also used, to prevent any potential off gassing. The bags are then properly labeled with the site and well identification, date and time collected, and sampler's identification. A chain of custody is completed and the bags are submitted for laboratory analysis within 72 hours of collection.

Methane field monitoring and laboratory analysis SOP (SOP-15) have been added to the QAPP, detailing the procedures that will be followed.

5.4 QA/QC SAMPLE COLLECTION

The following quality assurance samples will be collected during the investigation: (1) duplicate soil and groundwater samples, (2) MS/MSD soil and groundwater samples, (3) field blank, (4) equipment blank, (5) trip blank, and (6) and methanol blank. The rationale for quality assurance sampling is presented in AKT Peerless' QAPP. The required collection frequency of the QA/QC samples is identified in AKT Peerless' QAPP. See Section 4.0 of this Work Plan/SAP for more information on the proposed QA/QC sampling.

5.5 CHAIN-OF-CUSTODY

Chain-of-custody protocol is necessary to ensure the integrity of samples from the time of collection to data reporting. Chain-of-custody protocols include proper sample labels, sample seals, sample storage, sample shipment, and documentation. Refer to the QAPP for the detailed explanation of sample custody procedures.

5.6 DECONTAMINATION PROCEDURES

5.6.1 Sample Collection Equipment

Strict decontamination procedures will be followed during the completion of investigation personnel to reduce the potential for cross-contamination. All drilling and down-hole sampling equipment will be decontaminated prior to first use onsite, and thereafter between uses, using a high-temperature, high-pressure spray washer, and/or a vigorous wash in an Alconox solution, followed by a tap water rinse, and a distilled water rinse.

5.6.2 Disposal of Investigation Derived Materials

During the course of the field investigation activities, disposable personal protective equipment (PPE) will be generated. AKT Peerless will dispose this PPE as municipal waste.

5.7 PERSONNEL MONITORING

During subsurface investigation activities, air monitoring will be conducted to ensure that the proper level of PPE is used. During these activities, a PID will be used for periodic evaluation of organic vapor in the breathing zone. The AKT Peerless' site health and safety officer (SHSO) will record the time and levels in the appropriate field logbook. Recordings will be taken every four hours or more often if field personnel determine it is necessary. The personnel air monitoring conducted at the subject property will be evaluated for use in determining adequate levels of protection for the investigative workers. Additional personnel air monitoring will be implemented if conditions at the subject property warrant. The PID will be operated in accordance with AKT Peerless SOP-5.

6.0 HEALTH AND SAFETY PLAN

The site specific HASP provides guidelines and procedures to protect the health and safety of personnel conducting field activities. The plan has been developed based on requirements contained in the following regulations and guidance documents:

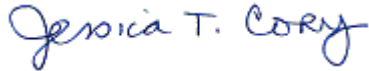
- 29 CFR 1910.120: *Safety and Health Regulation for General Industry*, Occupational Safety and Health Administration (OSHA), as amended, December 1986.
- *Standard Operating Safety Guides*, U.S. Environmental Protection Agency (EPA), 1992.
- *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, National Institute of Occupational Safety and Health Administration (NIOSH), Publication No. 85-115, October 1985.

7.0 SIGNATURE

This Work Plan/SAP was prepared by AKT Peerless Environmental & Energy Services and is based on information available at the time of development of this plan, and is subject to revision as new data and information on potential health and safety hazards at the subject property becomes available.

Sincerely,

AKT PEERLESS ENVIRONMENTAL & ENERGY SERVICES

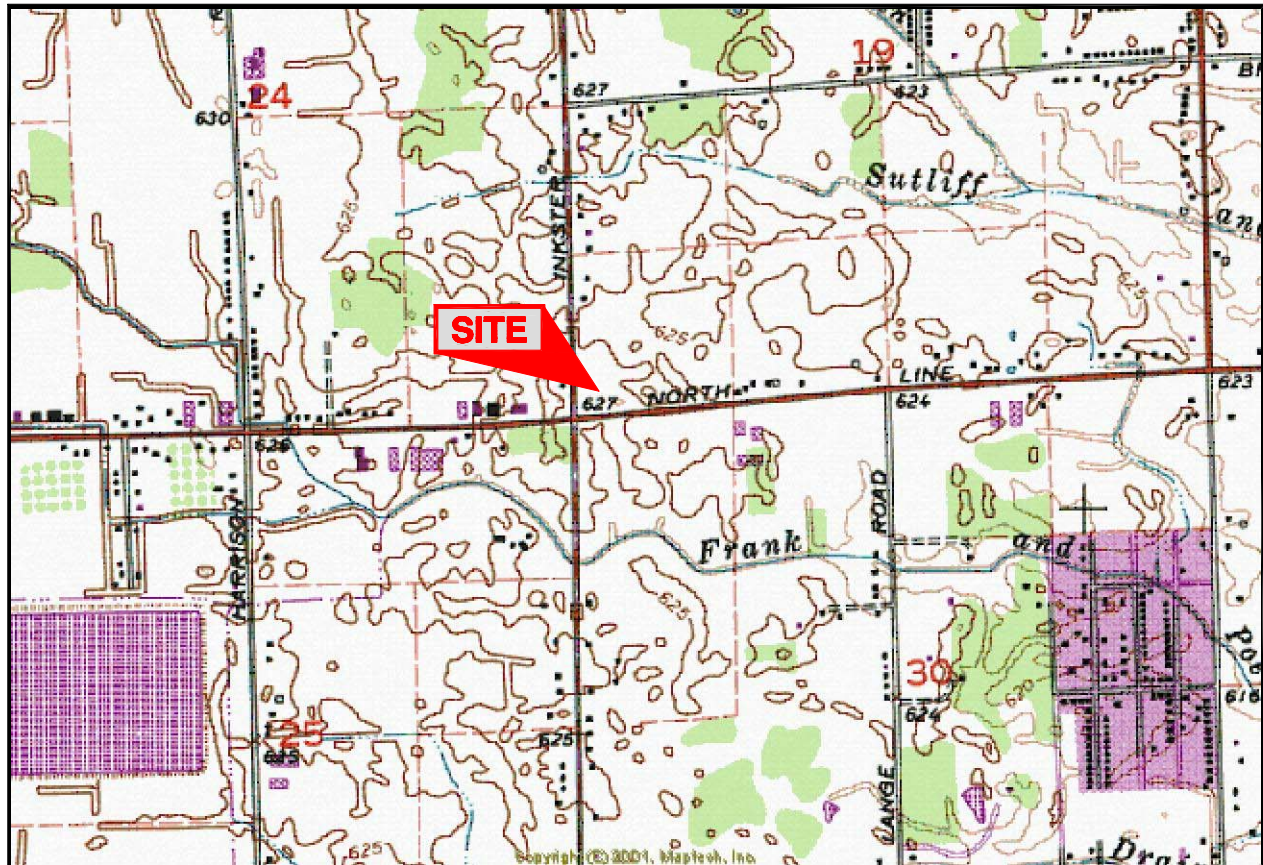


Jessica T. Cory
Project Manager

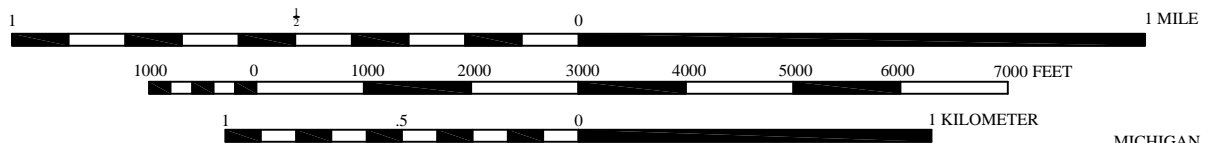
FIGURES

FLAT ROCK NE QUADRANGLE

MICHIGAN - WAYNE COUNTY
7.5 MINUTE SERIES (TOPOGRAPHIC)



T.3 S. - R.10 E.



CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

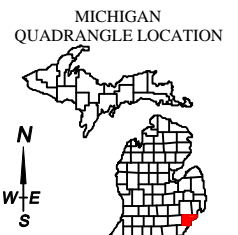


IMAGE TAKEN FROM 1967 U.S.G.S. TOPOGRAPHIC MAP
PHOTOREVISED 1973 AND 1980

AKTPEERLESS
environmental & energy services
CHICAGO DETROIT FARMINGTON LANSING SAGINAW
www.aktpeerless.com

TOPOGRAPHIC LOCATION MAP

NEC OF NORTHLINE AND INKSTER ROADS
PARCELS: 051-99-0014-701 AND
051-99-0003-000
TAYLOR, MICHIGAN
PROJECT NUMBER : 6278F-2-20

DRAWN BY: K Edmond
DATE: 9/23/2009

FIGURE 1

